CALIFORNIA COMPUTER PRODUCTS, INC. 305 N. Muller Street, Anaheim, California 92803

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DIGITAL PLOTTING NEWSLETTER

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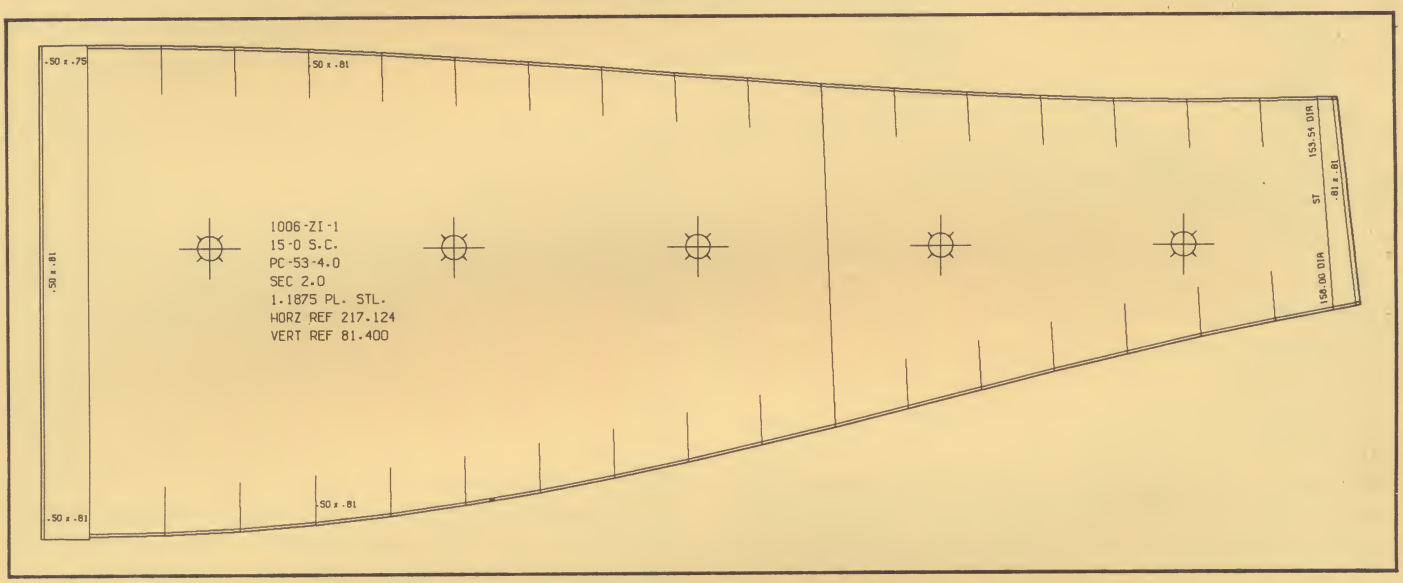


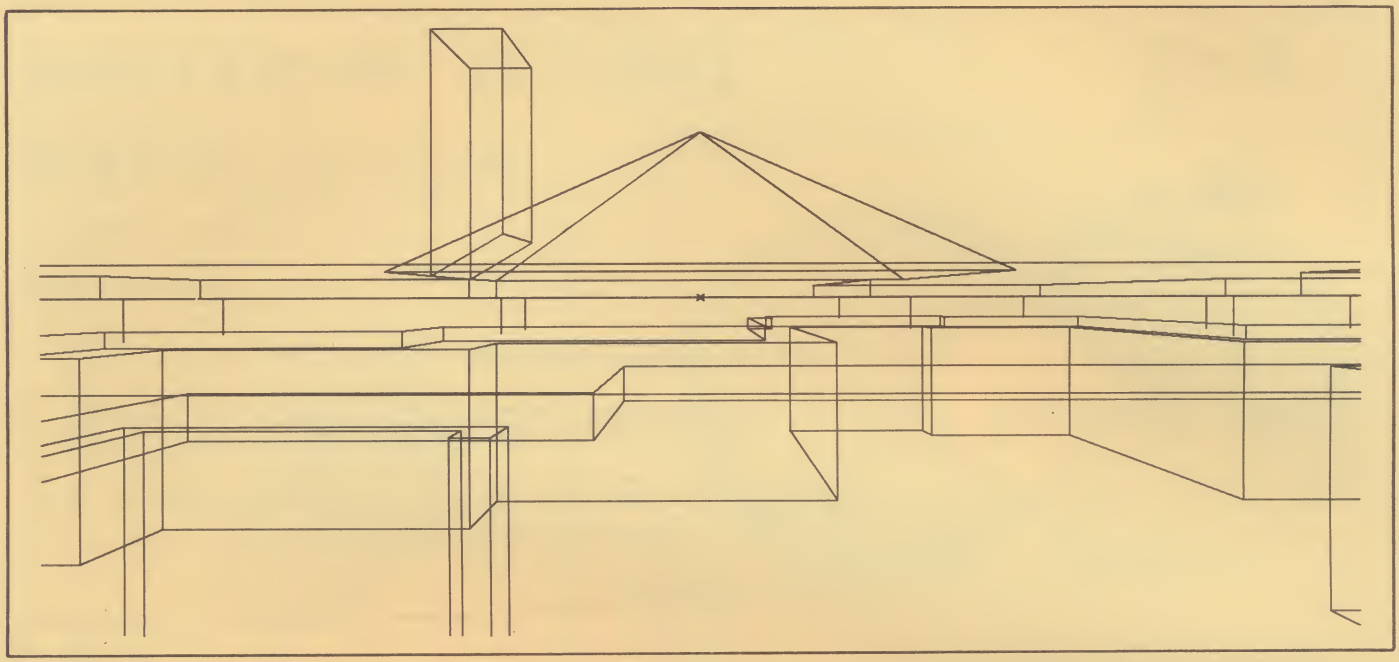
COMPUTER/PLOTTER TEAM SPEEDS SPIRAL CASE LAYOUTS

The drawing above is a portion of a spiral case layout for a hydraulic turbine designed by Allis-Chalmers, Milwaukee, Wisconsin. Layout drawings of this type are prepared on a CalComp 470/563 off-line plotting system, with a considerable savings in time and manpower compared with previous manual methods.

The spiral case of a hydraulic turbine is designed to maintain essentially constant velocity of water flow at the inlet vanes to the turbine, and has a tapered cylindrical shape similar to a snail shell. The area of each of the 20 sections is reduced by approximately 1/20th of the inlet area, resulting in the spiral shape. The radius of each edge of each section and other variables are computed as a function of the section areas. For many years, a manual graphical layout procedure was used to determine the shape of each section of the spiral case as viewed on a flat plate surface. This is an exacting, tedious procedure, and extreme care is required, since the method is subject to cumulative errors. After the edge coordinates for each flat plate were established by this graphical procedure, detailed layout drawings were prepared by draftsmen, showing all markings required for the manufacturing operation.

Mr. D. C. Lovejoy, Supervisor of Engineering and Math Analysis, Scientific Systems Division, reports that the use of computers for these two operations has resulted in a considerable savings in time, with no sacrifice in accuracy. The mathematical equivalent of the graphical layout procedure is performed on an IBM 360 Mod 40 computer, and a plot tape is generated for the off-line plotting system which produces the detailed layout drawings.

Allis-Chalmers has also developed a similar program for plotting detailed drawings of the plates which form the draft tube of the hydraulic turbine. This tube carries the water exhausted from the turbine to the point of discharge into the basin below the dam.

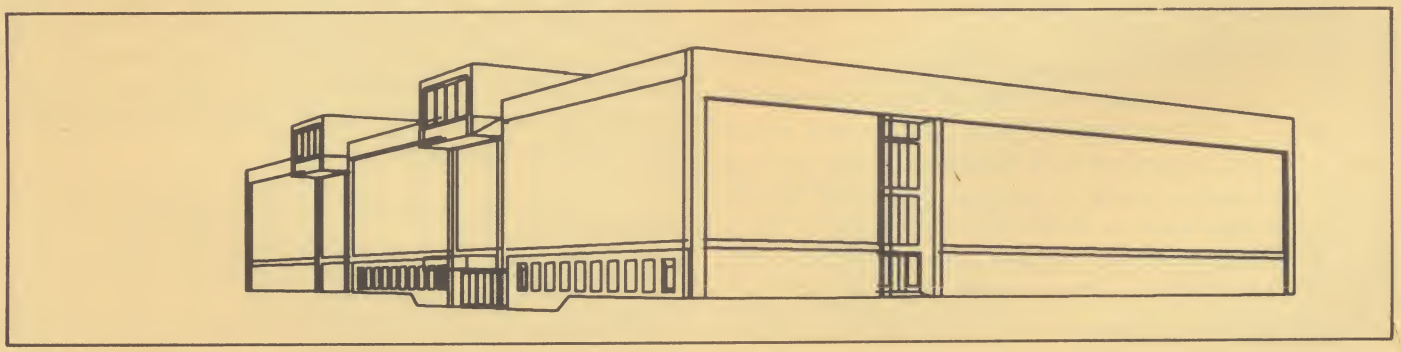


PLOTTERS GIVE ARCHITECTS BETTER PERSPECTIVE

"Not only does the world of computers establish new ways of organizing mass and space in more integrated patterns, it makes feasible previously unheard of methods for shaping our environment . . . The use of computers in architecture is not a fad, but the next step forward in the historical process of a developing profession."

The author of these words, from an article titled "Architecture and the Computer" published in *Engineering Digest*, is Allen Bernholtz, assistant professor of architecture and computer technology, now associated with the Graduate School of Design at Harvard. Professor Bernholtz has done extensive pioneering work in adapting the capabilities of the digital computer and CalComp digital plotter to the unique problems of architectural design. He envisions the day when plotter-drawn perspectives will be superimposed, in animated cartoon fashion, on 3-D movies taken at the client's site, enabling him to "see" the proposed structure from all viewpoints, both inside and out. The feasibility of this approach was proven in an animated film produced by Mr. Bernholtz and his students. A series of perspective drawings was prepared on the plotter (a CalComp 565) from data supplied by an IBM 7094, with the viewpoint of each successive drawing offset by a few degrees. Each drawing was photographed on a single frame of 8mm movie film. The result is a simulated "walk" around the structure. The drawing shown above was generated by the same computer program, and illustrates a house designed by Professor Bernholtz and his associates for an architectural competition.

The perspective shown below is typical of the plotter-generated drawings provided as a service to architects and engineers by Design Systems, Inc. of Boston. The company uses a Control Data 6400 computer and an off-line CalComp 565 to produce the perspectives, based on digitized coordinate data from elevation and plan drawings. Perspective layouts are drawn at any scale and at any desired vertical or horizontal displacement. In addition, Design Systems supplies clients with working drawings, three-dimensional contour maps, plans and elevations.



NEW LOCATION FOR NEDCOMP

CalComp's European distributor, Nederlandse Computer Maatschappij N.V. (NedComp), has moved to new quarters.

The new address is:

Nederlandse Computer Mij. N.V.
Nieuwe Herengracht 91
Amsterdam, Holland

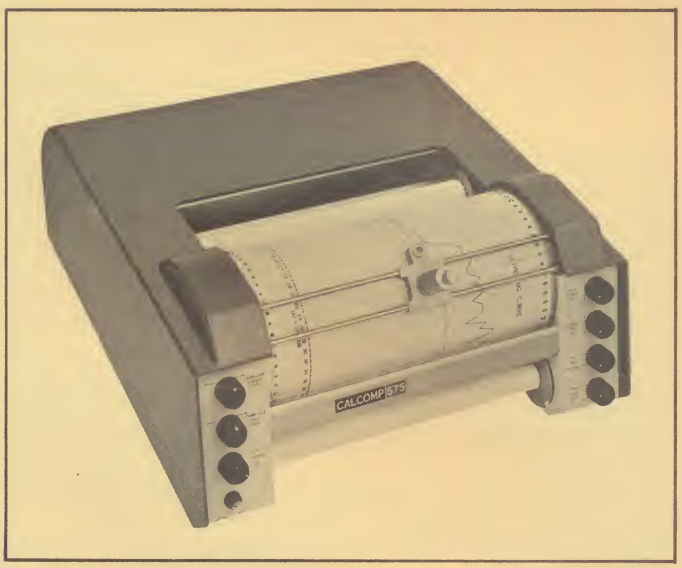
NedComp's phone number is unchanged: 238-138.

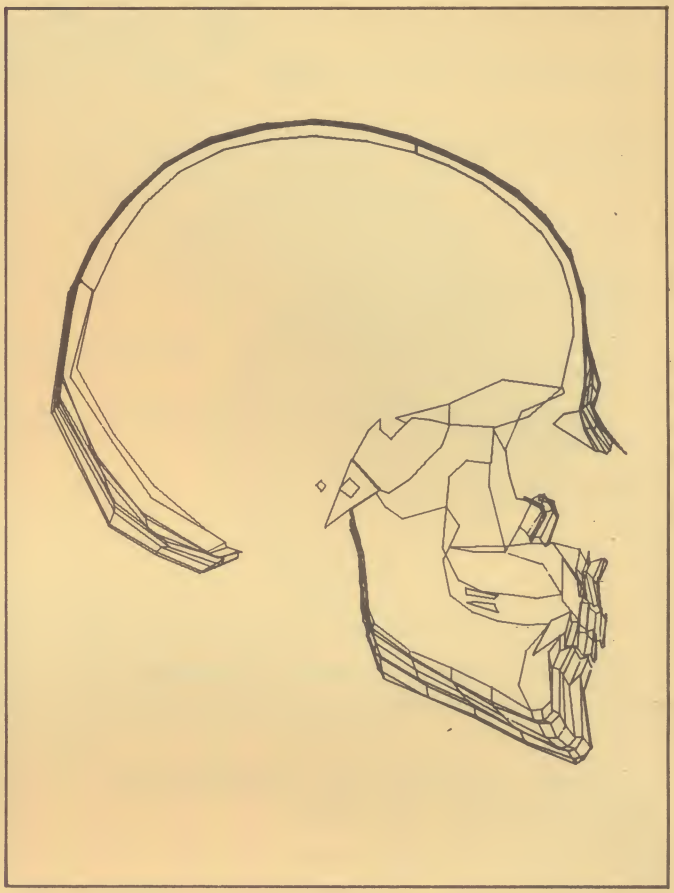
SPECIAL SYMBOL ROUTINE

The Atomic Energy Division of Phillips Petroleum Company, Idaho Falls, Idaho has developed a special CalComp plotter symbol routine. In a note to DPN, Mr. Larry J. Gannon of the Math Analysis and Machine Computations Branch reports that the new routine, designated SYMBL5, is a modification of the standard SYMBL4 routine which enables the user to define his own symbols. It permits the generation of Greek letters and other special characters, subscripts and superscripts along with the standard symbols. The desired symbols are defined by giving the coordinates for pen movements in a 5 x 8 grid. SYMBL5 requires 15_8 or 13_{10} core locations. The work was performed at Phillips under auspices of the U.S. Atomic Energy Commission.

NEW REMOTE PLOTTER

CalComp has introduced the Model 575, a modified version of the well-known 565 drum plotter, with built-in electronics for interface with standard Bell System DATA-PHONE equipment. The 575 provides high-speed digital incremental plotting of computer output at remote locations, nearby or thousands of miles from the data source. The unit can also be operated as a standard on-line or off-line plotter, directly interchangeable with the CalComp Model 565.





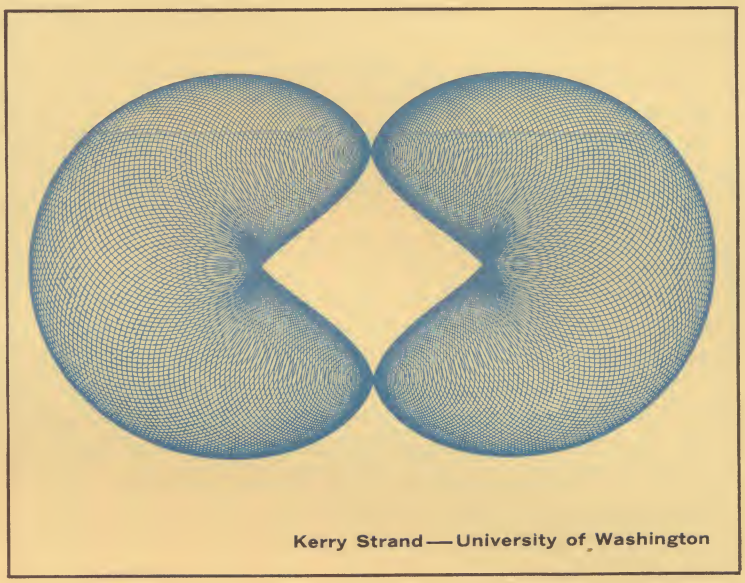
PLOTTER AIDS ANTHROPOLOGISTS

The diagram above shows changes that occur in the skull bone structure over a period of years in a growing child. It is one of several examples from a report titled *Analysis of Skull Shapes by Electronic Methods*, by Dr. G. F. Walker, Department of Anthropology, University of Pennsylvania. Diagrams of this type are drawn on a Control Data 165 (CalComp 565) digital plotter, operating on-line with a CDC 160A computer. Dr. Walker is the Principal Investigator in a research program directed toward development of electronic methods for measuring complex shapes. These methods are applied to X-rays of the human head to allow them to be measured and described in quantitative terms. Analytical and statistical procedures are then used to evaluate growth, clinical abnormalities, and racial variations. Analysis of growth data provides information for computer simulation of normal and abnormal growth conditions.

X-ray photographs of human skulls are manually traced and digitized to provide X-Y coordinates of 177 points which comprise a "mathematical model" of the skull patterns. The data is fed to the computer via punched cards for editing and processing. In addition to its function in the analyses, the plotter provides an accuracy check on the manual tracing and digitizing processes. Errors are easily detected by comparing the plotter diagram with the tracing made from the original X-ray.

The Gallery of Fine Art

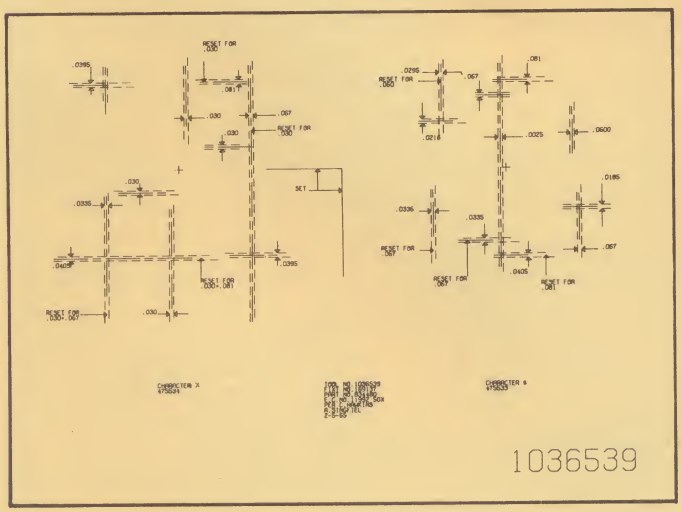
Gary Kildahl — University of Washington



Kerry Strand — University of Washington

PLOTTER GENERATES PRECISION COMPARATOR CHARTS

IBM Systems Manufacturing Division, Rochester, Minnesota, reports savings of 85% in man-hours and 30% in costs with a computer-plotter system for generating precision comparator charts used in parts inspection. Simple numeric and English coded statements are keypunched for input to an IBM 7090 computer which generates instructions for an IBM 1401 coupled to a CalComp 564 plotter. The plotter chart is converted to a photo transparency for use on the comparator. Tolerances as close as .001 inch are required. Details on the program are given in an article from *The Tool and Manufacturing Engineer,* by R. G. Beard and A. E. Singfiel of IBM Rochester. Reprints are available from CalComp on request.



"CRYSTAL BALL" PLOTTER ON TV

The start of a new year is traditionally the time for "crystal ball gazing," but this year KNBC-TV, Channel 4, Los Angeles, gave the old tradition a new twist. In a TV special called "Prediction '67," KNBC invited experts in the fields of politics, sports, fashions, and world affairs to match their knowledge and intuition against the statistical prowess of a computer, aided and abetted by a CalComp 763 Zip Mode plotting system. The computer/plotter team did an excellent job, as did the experts, but the winner won't be known for another year.

NEW CALCOMP SALES OFFICES

CalComp has opened two new district sales offices in addition to those announced in our last issue:

Alabama, Tennessee, Georgia,
Mississippi, Florida
2407 South Memorial Parkway
Suite 11
Huntsville, Alabama
Phone (205) 536-6677

Michigan
17000 West Eight Mile Road
Suite 185
Southfield, Michigan 48075
Phone (313) 358-3130